the Rain events

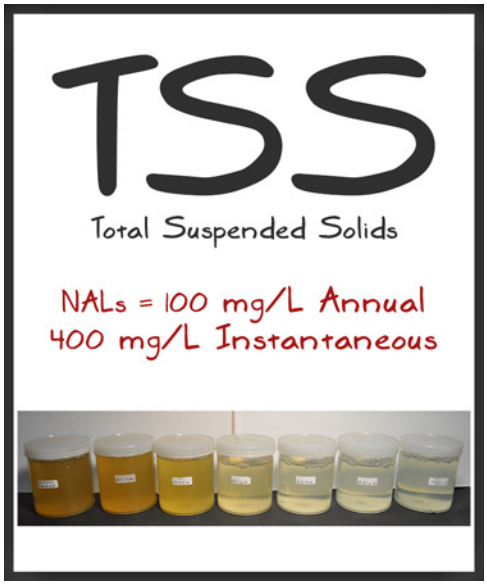
February/March 2018

phosphorus	oxygen	lutetium	tantalum	nitrogen	tennessine
15	8	71	73	7	117
P	O	Lu	Ta	N	Ts
30.974	15.999	174.97	180.95	14.007	[294]

*Part 9 of a 12-part **exclusive series** on understanding storm water pollutants*

Pop quiz: Which IGP Table 2 pollutant has the most NAL exceedances? Alright, alright. We'll tell you the answer – Total Suspended Solids, or TSS. During the 2016-2017 year, there were a total of 3,825 NAL exceedances for TSS – judging by that number, it's safe to say that there are many California facilities who are struggling with TSS. Ironically, out of all the Table 2 pollutants, TSS is also the easiest one to treat in storm water runoff. In this edition of ***The Rain Events,*** we'll take a look at the analytical procedure for Total Suspended Solids, and offer some advice as to how you can bring your numbers back under control.

What is TSS? Is it the same as turbidity? To answer these questions, we need to look at how the analytical test is performed. According to Table 2 in the Industrial General Permit, the analytical method for Total Suspended Solids is Standard Method 2540 D (or SM 2540D). If you turn to section 2540 in the Standard Methods handbook, you'll find that this particular test is grouped with a bunch of other tests that measure the concentration of solids in water. Method 2540 D measures only *suspended* solids by passing water through a 2.0 µm filter, and measuring the weight difference of the filter. The analytical method contains steps to ensure that dissolved solids (like salts and minerals) are not reported through this test. Turbidity, while similar in some ways to TSS, is an optical test as opposed to a mechanical one. The difference between tests can be radical, specifically when it comes to colloidal clay suspensions. Colloids can pass right through a 2 µm filter, but will cause a very high turbidity number.



So, what is measured by TSS, and what isn't measured? Well, anything that doesn't pass through the 2 µm filter is potentially measured. That being said, the lab does not usually use the entire 1-liter sample to perform the test – and unless they are broken up and distributed when stirred, large floating particles, submerged agglomerates, and non-homogenous materials are typically excluded from the test as non-representative.

Most dissolved solids will pass through the filter, but before drying and weighing the sample, the lab will triple-rinse the filter with deionized water to remove any stubborn dissolved solids.

What causes high TSS numbers? The obvious culprit is sediment – but what may not be so obvious is the source of the sediment. Sediment could be coming from erosion, industrial activities (sawdust, concrete or lime dust, etc.), tracked in from off-site, or blown onto your facility from next door. We've had clients with paved parking lots experience very high TSS numbers, while other clients have gravel lots and somehow still stay under the NALs.

Fortunately, sediment is almost always visible, and can be cleaned up fairly easily. Interestingly, many other pollutant problems can be traced back to sediment too. For instance, many times we have noticed a direct link between metals and TSS – high TSS tends to correlate with high metals, and vice versa. So, staying on top of any loose sediment, dust, or dirt on your site can have the added advantage of keeping your other sampling parameters under control.

If your facility is permeable and sweeping isn't practical, there are other things you can do to control sediment. Gravel is very effective – a ring of gravel around drain inlets can drastically reduce TSS. If you can cover all of your permeable surfaces with gravel, even better!

Compost socks work wonders with sediment, but can cause flooding, especially with a heavy sediment load. Drain insert bags are minimally useful for TSS, because they don't capture fine particles. And don't install them where you collect a sample – disturbing the drain bag releases all sorts of trapped pollutants directly into the water that you're sampling.

To sum up, TSS comes – not surprisingly – from sediment. The bad news is that sediment is everywhere; but the good news is that it's pretty easy to control. A regular sweeping schedule can vastly improve high TSS numbers, and there are many relatively cheap and effective sediment BMP products on the market.

Sources:

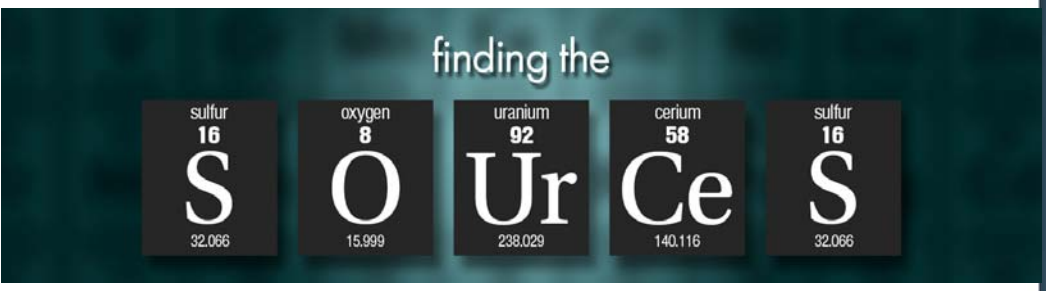
1. Baird, Rodger, Andrew D. Eaton, Eugene W. Rice, and Laura Bridgewater. *Standard Methods for the Examination of Water and Wastewater*. Washington, DC: American Public Health Association, 2017.
2. Wikipedia, s.v., "Total Suspended Solids," *Wikipedia The Free Encyclopedia*, last modified July 19, 2017, https://en.wikipedia.org/w/index.php?title=Total_suspended_solids&oldid=791237233

How turbid is it?

If you've ever looked at a freshly-filled sample bottle and wondered how high the TSS result is going to be, you're not alone. So, here are a few guidelines that might help you guess more accurately.

In most situations, a total suspended solids concentration below 20 mg/L appears clear, while levels over 40 mg/L may begin to appear cloudy. In comparison, a turbidity reading below 5 NTU appears clear, while a reading of 55 NTU will start to look cloudy and a reading over 500 NTU will appear completely opaque.

It is important to note that this is dependent on the size and nature of the suspended solids. Typical turbidity and TSS levels are difficult to quantify due to their natural variation by season, local geology, water flow and weather events. During a low-flow period, most rivers and lakes are fairly clear with a turbidity reading below 10 NTU. These readings can easily jump into the hundreds due to runoff during a rainstorm, snowmelt or a dredging project. By comparison, drinking water should have less than 5 NTU, preferably less than 1 NTU, and ideally below 0.1 NTU.



The culprit: sediment. The sources? Endless! If you're having high TSS numbers at your facility, here's a couple ideas to nail down the source.

- Exposed soils, especially bare or eroding soil.
- Powdery industrial materials (sawdust, gypsum board dust, lime, sand/gravel, etc)
- Tracked-on sediment from vehicle tires
- Historical sediment in storm drain lines
- Wind-blown dust or dirt from adjoining property

Have questions about the Industrial General Permit?
Give us a call at (209) 334-5363, ext. 114

"To Do List" for March:

- Perform the March monthly inspection
- If you're not finished already, collect the last two storm water samples for the 2017-2018 storm water year.
- Make sure all of your sample results for the first half of the 2017-2018 year have been uploaded to SMARTS. Remember, Ad Hoc reports must be submitted **within 30 days** of collecting a sample.

The Worst Offenders

Ever wonder which IGP Table 2 pollutants have the most NAL exceedances? Well, for your enjoyment, we've compiled a list of the top eight NAL exceeders from the 2016-2017 storm water year.

1. TSS: 3,825 samples above 100 mg/L (highest: 103,660 mg/L)
2. Iron: 3,670 samples above 1.0 mg/L (highest: 150,000 mg/L)
3. Zinc: 2,710 samples above 0.26 mg/L (highest: 7,500 mg/L).
4. Copper: 1,416 samples above 0.0332 mg/L (highest: 175 mg/L).
5. pH: 1,178 samples above 9.0 or below 6.0
6. COD: 965 samples above 120 mg/L (highest: 13,900 mg/L)
7. Oil and Grease: 696 samples above 15 mg/L (highest: 1,500 mg/L)
8. BOD: 155 samples above 30 mg/L (highest: 1,500 mg/L)

Source: SMARTS

Please contact us if you have any questions …

The Rain Events

Newsletter Editor: John Teravskis
QSD/QSP, QISP, CPESC, ToR, IGPTT Participant
jteravskis@wgr-sw.com
(209) 334-5363 ext. 110 or (209) 649-0877

Technical Questions about Environmental Compliance?

Call …

Aaron Ortiz, QISP, ToR, aortiz@wgr-sw.com
(209) 334-5363 ext. 114

Steve Teravskis, steravskis@wgr-sw.com
(209) 334-5363 ext. 115

Chelsea Dreyer, cdreyer@wgr-sw.com
(562) 799-8510 ext. 1003

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PRODUCT SPOTLIGHT

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Product Specifications:
- Range: 0 to 1000 NTU
- Resolution: Down to 0.01 NTU
- Accuracy: +/- 2% below 500 NTU; +/- 3% above 500 NTU.
- Repeatability: +/- 0.01 NTU, or 1%
- Comes with four calibration standards, collection bottle, lint-free cloth, silicone oil, batteries, and hard carrying case.

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BMP Outlet is a supply house for affordable erosion control products, drain inlet protection, sorbents, spill containment, and field instruments.

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Eliminate drips underneath your vehicles and equipment with Elima-Drip drip containment pads. Elima-Drip pads are weighted absorbent pouches contained in heavy-duty vinyl sleeves, which protect the spill pads from accidental movement. The 50”x20” pad is capable of containing up to 50 ounces of oil, and the 30”x20” pad can contain up to 29 ounces. Best of all, these pads are reusable! Simply replace the pouch inside the vinyl sleeve.

Product Specifications:
Outside Material: Heavy-duty vinyl sleeve
Spill Containment Media: Absorbent pads
Dimensions: 50″x20″ or 30″x20″

$48.00 (30”x20”)
$58.00 (50”x20”)

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Storm Water Contest...

Each month, we invite our readers to participate in a contest to test their knowledge of the Industrial General Permit and their storm water compliance program. We enter all submittals to our monthly newsletter question into a drawing, and one person is selected at random to receive a $25 gift card. Last month's question was:

Why doesn't oil dissolve in water?

Good job, **Paul Siebensohn,** you're correct! Oils are non-polar (water is polar), and hydrophobic. Paul wins a $25 gift card to Chili's!

This Month's Contest Question:

Take a guess - will milk (a colloid) have a higher reading from TSS or from Turbidity? Why?

By April 6, 2018, submit your response to the above question by sending an email to jteravskis@wgr-sw.com. All persons submitting the correct answer will be placed in a drawing. The winner will receive a $25 gift card to Chili's.

Panera BREAD